

ABSTRACT OF THE DISCLOSURE

There is provided a MQB layer as a multi-quantum barrier portion composed of well layers and barrier layers that are formed of extremely thin films having different compositions and alternately stacked. This enhances an effective barrier height by using the phenomenon that holes likely to flow from a SiGe base layer to a Si emitter layer are reflected by the MQB layer and thereby suppresses the reverse injection of the holes from the SiGe base layer into the Si emitter layer. As a result, the reverse injection of carriers is suppressed by the MQB layer even when the base doping concentration is increased, which provides a satisfactory current amplification factor and increases a maximum oscillation frequency. What results is a bipolar transistor having excellent RF characteristics such as current amplification factor, current gain cutoff frequency, and maximum oscillation frequency in a microwave band or the like.